WHAT IS CLAIMED IS:

1. A method for producing a coupling compound of formula (1):

$$(Y-)_{(n-1)}R^1-R^2-(R^1)_{(n'-1)} \qquad (1)$$

wherein R^1, R^2 n and n′ are as defined below,

Y is R^2 or X as defined below,

which method comprises reacting

an organic halogen compound of formula (2):

$$n'(R^1X^1_n) \qquad (2)$$

wherein X^1 represents a bromine or iodine,

R^1 represents a substituted or unsubstituted, linear, branched or cyclic hydrocarbon group of which α and β carbon atoms in relation to X^1 are sp3 carbon atoms,

n and n′ each independently represent an integer of 1 or 2, and provided that n and n′ do not simultaneously represent 2,

with an organic boron compound of formula (3):

$$m\{R^2(BX^2_2)_{n'}\} \qquad (3)$$

wherein R^2 represents a substituted or unsubstituted aryl group or a substituted or unsubstituted alkenyl group and the boron atom is bonded with a sp2 carbon atom thereof,

X^2 represents a hydroxyl or alkoxy group,

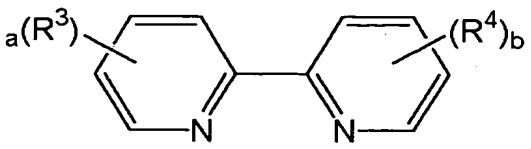
n′ is as defined above,

m represents an integer of 1 or 2, and m is not more than n,

in the presence of a catalyst comprising

a) a nickel compound, and

b) b-1) a compound of formula (i):



(i)

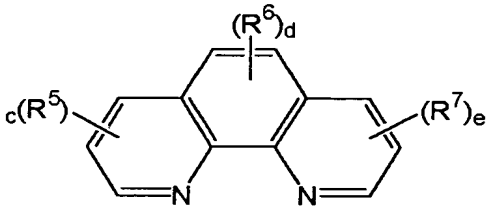
wherein R^3 and R^4 each independently represent

an alkyl, aryl, alkenyl, alkynyl, alkoxyl, hydroxy, hydroxyalkyl, sulfo, alkyloxycarbonyl, aryloxycarbonyl, carbamoyl, cyano, isocyano, cyanato, isocyanato or formyl group, or a hydrocarbylsilyl group, and

optionally two adjacent groups among R^3 and R^4 groups with the carbon atoms to which they are bonded form a ring,

a and b are the same or different and independently represent an integer of 0 to 4, or

b-2) a compound of formula (ii):



(ii)

wherein R^5, R^6 and R^7 groups are the same or different and independently represent

an alkyl, aryl, alkenyl, alkynyl, alkoxyl, hydroxy, sulfo, alkyloxycarbonyl, aryloxycarbonyl, carbamoyl, cyano, isocyano, cyanato, isocyanato or formyl group, or a hydrocarbylsilyl group, and

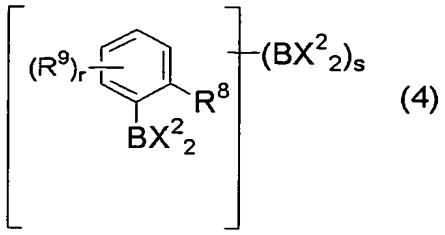
optionally two adjacent groups among R^5, R^6, and R^7 groups with the carbon atoms to which they are bonded form a ring,

c, and e are the same or different and independently represent an integer of 0 to 3, and

d represents an integer of 0 to 2; or

a mixture thereof.

2. A method according to claim 1, wherein the organic boron compound of formula (3) is a boron compound of formula (4):



(4)

wherein R^8 represents a hydrogen atom,

r represents an integer of 0 to 4,

s represents an integer of 0 or 1,

R^9 is the same or different and independently represents

a substituted or unsubstituted aryl group,

a subtituted or unsubstituted heteoaryl group, or

a substituted or unsubstituted linear, branched, or cyclic alkenyl group, or

R^9 groups bonded with adjacent carbon atoms of the benzene ring together with the benzene ring form an orth, or ortho, peri condensed polycyclic aromatic ring,

X^2 represents a hydroxyl or alkoxy group, or

X^2_2 groups together form an alkylendioxy group, or

a boronic acid trimer thereof, and

$r+s \leq 4$ when the benzene ring does not form a condensed polycyclic aromatic ring.

3. A method according to claim 1 or 2, wherein the nickel compound is a nickel salt, or π complex compound of zero or divalent nickel.

4. A method according to claim 1 or 2, wherein R^3 and

R^4 are alkyl and a and b are 1 or 2.

5. A method according to claim 1 or 2, wherein a and b are 0.

6. A method according to claim 1 or 2, wherein R^5 to R^7 are alkyl, and c, d and e are 1 or 2.

7. A method according to claim 3, wherein c, d and e are 0.

8. A method according to claim 1, wherein the compound of formula (i) is

dipyridyl, 4,4'-dimethyl-2,2'-dipyridyl, 4,4'-diphenyl-,2,2'-dipyridyl, 5,5-dimethyl-2,2'-dipyridyl, 4,4'-di-t-butyl-2,2'-dipyridyl, 6-methyl-2,2'-dipyridyl, 2,2'-biquinoline, 6,6'-bi-2-picoline, 2,2'-bi-4-lepidine, 4,4'-dinonyl-2,2'-dipyridyl, 2,2'-dipyridyl-3,3'-diol, 2,2'-biquinolinyl-4,4'-dicarboxylic acid dibutyl ester, or 4,4' dimethoxy-2,2'-dipyridyl, and

the compound of formula (ii) is

2,9-dimethyl-4,7—diphenyl-1,10-phenanthroline,
2,9-dimethyl-1,10-phenanthroline,
3,4,7,8-tetramethyl-1,10-phenanthroline,
4,7-dihydroxy-1,10-phenanthroline,
4,7-diphenyl-1,10-phenanthroline,
4-methyl-1,10-phenanthroline,
5-methy-1,10-phenanthroline, 5-phenyl-1,10-phenanthroline,
4,7-dimethyl-1,10-phenanthroline,
5,6-dimethyl-1,10-phenanthroline,
1,10-phenanthroline-2,9-dimethanol, or
2,9-di-n-butyl-1,10-phenanthroline.